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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/625,769	07/26/2000	Chiyoaki Iijima	9319S-000142	7886

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EXAMINER

SCHECHTER, ANDREW M

ART UNIT	PAPER NUMBER
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2871

DATE MAILED: 01/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/625,769

Applicant(s)

IIJIMA, CHIYOAKI

Examiner

Andrew Schechter

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-4, 6-11 and 16-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 1-4 and 6-11 is/are allowed.
- 6) ☒ Claim(s) 16-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Prosecution Reopened

1. In view of the reply brief filed on 29 September 2003, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

- (1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,
- (2) request reinstatement of the appeal.

If reinstatement of the appeal is requested, such request must be accompanied by a supplemental appeal brief, but no new amendments, affidavits (37 CFR 1.130, 1.131 or 1.132) or other evidence are permitted. See 37 CFR 1.193(b)(2).

Response to Arguments

2. Applicant's arguments filed 29 September 2003 have been fully considered but they are not persuasive.

In the reply brief, the applicant presents an entirely new argument [p. 2], stating that "Weber does not teach the dimensions of the components", so "the examiner's conclusion that d [the distance between the light diffuser and the light reflector] will be greater than 0.7 mm is without support".

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Claim 16 recites the limitation that the haze value H satisfies $H(\%) \geq -200d + 140$ (mm). Since the haze H is a percentage between 0 and 100, this limitation will always be satisfied if the distance d is greater than 0.7 mm. Describing the prior art, the examiner's previous rejection stated in part:

There are at least two substrates [150 and 152] between the diffuser and the reflector, to say nothing of the thickness of the light guide itself, so d will be greater than 0.7 mm and the recited haze inequality is automatically satisfied (the haze is always greater than or equal to zero or any negative number).

This conclusion was based on the examiner's assumption that the LCD shown in *Weber's* Fig. 9 has certain conventional dimensions. In particular, from as far back as the Office Action of 11 April 2002, Paper No. 8, p. 5, the examiner has assumed that the substrates [150 and 152] have a conventional thickness of about 1.1 mm. Two such substrates would be 2.2 mm (already three times the required value of d) -- to which must be added the thickness of the light guide and various other layers shown -- the result being a distance d which far exceeds 0.7 mm and easily satisfies the claim limitation.

However, the applicants now point out that the examiner's assumption on the thickness of these layers is without explicit support. The following rejections therefore provide explicit support for the examiner's position.

Specification

3. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "LCD with diffuser having particular haze value between liquid crystal panel and reflector, and reduced parallax".

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 16 and 19-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Weber et al.*, U.S. Patent No. 5,686,979 in view of *Ouderkirk, et al.*, U.S. Patent No. 5,828,488 and *Broer et al.*, U.S. Patent No. 6,359,670, and further in view of *Willet et al.*, U.S. Patent No. 5,398,125, *Gunning, III*, U.S. Patent No. 5,926,241, *Hamanaka et al.*, U.S. Patent No. 5,990,992, and *Endo et al.*, U.S. Patent No. 6,016,174.

Weber discloses [see Fig. 9] a display device adapted to provide both reflection type display and transmission type display, comprising a liquid crystal panel [142] including a liquid crystal material, and an illuminating device [132] adapted to illuminate the panel in transmission-type display mode, where the illuminating device has a light guiding member [col. 11, lines 63]. The device also comprises a light diffuser [134],

arranged between the liquid crystal material and the backlight (which can contain a reflector, as will be discussed below).

Weber does not explicitly disclose that the light diffuser has "forward scattering characteristics". *Ouderkirk* teaches using a diffuser "with a high degree of forward scattering" in an analogous context [col. 3, lines 12-15]. It would have been obvious to one of ordinary skill in the art at the time of the invention to do so in the device of *Weber*, motivated among other reasons by *Ouderkirk's* teaching that this is equivalent to low reflectivity, so that the light will be efficiently utilized.

Weber does not explicitly disclose a light reflector. *Weber* does disclose an illuminating device [132] and suggests a variety of possibilities [col. 11, lines 61-64], but without explicit details such as whether there is a reflector present. *Broer* discloses [see Fig. 1] a conventional backlight structure, which has a light source [10] introducing light into a light guiding member which has a light reflector [11] on its bottom surface. It would have been obvious to one of ordinary skill in the art at the time of the invention to use this conventional backlight structure, motivated by its being well-known and its having such advantages as being thin and having efficient use of light due to the reflector. When the device is in reflection type display mode, therefore, this element [11] acts as the light reflector of claim 16, reflecting an external light impinged upon the liquid crystal panel in a reflection type display mode, and positioned behind the illumination device relative to the external light.

Weber does not explicitly disclose the final limitation that the haze H of the light diffuser and the distance d between the light diffuser and the light reflector satisfy the

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relation: $H(\%) \geq -200d + 140$ (mm). Since H cannot be less than zero, this limitation is automatically satisfied by the distance satisfying $d \geq 0.7$ mm. In *Weber*, the distance d stretches across two substrates [150 and 152] and a light guide. However, *Weber* does not explicitly disclose what the thicknesses of these elements are.

The examiner previously assumed that a substrate thickness of 1.1 mm was conventional. This is supported by *Willett*: “[t]he thicknesses of substrates ... used in LCDs are usually not tightly specified – 1.1 mm \pm 0.1 mm is typical” [col. 4, lines 31-33] and by *Gunning, III*: “the thickness of the liquid crystal cell’s substrate (typically 1.1 millimeter, mm)” [col. 3, lines 41-43]. Furthermore, *Hamanaka* discloses that “commercially available glass substrates in reality have only certain thicknesses such as of 1.1 mm and 0.7 mm” [col. 4, lines 3-4]. Finally, *Endo* teaches that

“The thickness of the insulating substrate may be optional, but it is desirable that the thickness of the insulating substrate ranges from about 0.7 mm to 1.1 mm in order to reduce the thickness of the electro-optic element. Because distortion occurs in the substrate by film forming or heat treatment during manufacturing process and nonconformity such as lowering the patterning accuracy is generated in the case the insulating substrate is excessively thin, it is necessary to select the thickness of the insulating substrate with the treatments carried out during the manufacturing process taken into account.” [col. 14, line 62 – col. 15, line 5, emphasis added]

Endo thus teaches that having the substrate be 0.7 mm – 1.1 mm is reducing the thickness (that is, this thickness is considered thin) and warns against making the substrates thinner due to possible distortions and nonconformity which could occur in

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the processing. It would therefore have been obvious to one of ordinary skill in the art at the time of the invention to make the substrates in *Weber* between 0.7 mm and 1.1 mm thick, as disclosed by *Willett*, *Gunning, III*, *Hamanaka*, and *Endo*, motivated by *Endo's* teaching that making them thinner can result in distortions and non-conformity. The distance d , which is larger than two such substrate thicknesses, would then easily satisfy $d \geq 0.7$ mm, which means that the claim limitation $H(\%) \geq -200d + 140$ (mm) is automatically met. Claim 16 is therefore unpatentable.

There is a light source [10] in *Broer* to introduce light to the light guiding member, and the illuminating device is between the light diffuser and the light reflector, so claims 20 and 21 are also unpatentable. There is a polarizer [138] on the front side of the liquid crystal display in *Weber*, and an absorbing polarizer [140] between the liquid crystal panel and the light reflector, so claims 23 and 19 are also unpatentable. There is reflective polarizer [144] between the polarizer [140] and the reflector, with the transmission axes coinciding, so claims 22 and 24 are also unpatentable.

6. Claims 17 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over *Weber* in view of *Ouderkirk*, *Broer*, *Willett*, *Gunning, III*, *Hamanaka*, and *Endo* as applied to claim 16 above.

Weber does not disclose color filters in its liquid crystal panel [142]. However, the examiner takes official notice that such (red, green, and blue) color filters are well-known and conventional. It would be obvious to one of ordinary skill in the art at the time of the invention to include them, motivated by the desire to create a color display as opposed to a black-and-white display. Claims 17 and 18 are therefore unpatentable.

Allowable Subject Matter

7. Claims 1-4 and 6-11 are allowed.
8. The following is a statement of reasons for the indication of allowable subject matter:

Claim 1 has been amended to specify that the diffuser-reflector distance d is between 0.7 and 0.2 mm, inclusive. The previous rejection of claim 1 over *Weber* in view of *Ouderkirk* was based on the device using a conventional substrate with thickness of 1.1 mm, when the distance d would be at least the thickness of two substrates. This amendment to claim 1 therefore overcomes the previous rejection, which is withdrawn. The prior art does not disclose a device having the recited values of diffuser-reflector distance and haze recited in claim 1. Claims 2-4 and 6-11 depend on claim 1.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Schechter whose telephone number is (703) 306-5801. The examiner can normally be reached on Monday - Friday, 9:00 - 5:30.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert H. Kim can be reached on (703) 305-3492. The fax phone number for the organization where this application or proceeding is assigned is (703) 746-4711.

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Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Andrew Schechter
12 December 2003



T. Choudhury
Primary Examiner